

### **ABSTRACT OF THE INVENTION**

A dispersion compensating optical fiber includes a segmented core having a central core segment, a moat segment and a ring segment. The refractive index profile is selected to provide a total dispersion at 1550 nm of between -114 and -143 ps/nm/km, and a kappa, defined as the total dispersion at 1550 nm divided by the dispersion slope at 1550 nm, of between 96 and 150 nm. Optical transmission systems including the present invention dispersion compensating optical fiber optically coupled to a moderate dispersion single mode transmission fiber having dispersion at 1550 nm of between 5 and 14 ps/nm/km are also disclosed. Example transmission systems preferably exhibit residual dispersion over the C+L wavelength band (1525 to 1625 nm) of less than +/- 20 ps/nm per 100 km of the moderate dispersion transmission fiber and less than +/- 10 ps/nm per 100 km of the moderate dispersion transmission fiber over the C band (1525 to 1565 nm).